

# **Modeling Circulation in the Lower Columbia River: Status and Vision**

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## **Abstract**

Modeling the circulation of the Lower Columbia River is a technically challenging task. Doing it in ways that inform both the scientific understanding and the regional management of the system adds logistical and political challenges. We discuss technical and non-technical challenges with a view for the future, in a multi-part presentation. We first provide a brief overview of the physical characteristics of the circulation in the Lower Columbia River, with emphasis on the estuary and the plume. The overall picture is that of an extremely dynamic and non-linear system, very responsive to diverse and highly variable external forcings, including river discharges, ocean tides, and regional winds.

We then describe CORIE (<http://www.ccalmr.ogi.edu/CORIE>), the observation and forecasting system for the Lower Columbia River that we have been developing since 1996. Designed as multi-purpose regional infrastructure, CORIE includes three integrated components: an observation network, a modeling system, and an information management system. Main products are long-term observations, daily forecasts, and long-term simulations databases.

Besides CORIE, several modeling efforts have been developed for the Lower Columbia River over the years. We briefly review some of those efforts, chosen to cover various scales and purposes, from Bonneville Dam to the Eastern North Pacific Ocean. We conclude by proposing, as a strawman for discussion during and beyond the workshop, a vision for the integration of objective modeling and scientific understanding of Columbia River circulation in regional decision-making. Inherently collaborative, this vision accounts for the multiplicity of regional stakeholders, representing widely diverse missions, needs and technical expertise.